

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner

v.

GEOSCOPE TECHNOLOGIES PTE. LTD.
Patent Owner

Case No. IPR2023-01210
Patent 8,400,358

**DECLARATION OF DAVID H. WILLIAMS IN SUPPORT OF
PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 8,400,358**

Declaration of David H. Williams In Support of
Petition for *Inter Partes* Review of U.S. Patent No. 8,400,358

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Exhibit No.	Description
1001	U.S. Patent No. 8,400,358, issued on March 19, 2013 (“the ’358 Patent”)
1002	File History of U.S. Patent Application No. 12/424,320, filed on April 15, 2009 (“the ’320 Application”)
1003	File History of Reexamination Control No. 90/012,694 (“the ’694 Reexam”)
1004	Reexamination Certificate issued on August 18, 2014 (Reexamination Control No. 90/012,694)
1005	U.S. Provisional Application No. 60/899,379, filed on February 5, 2007 (“the ’379 Provisional”)
1006	U.S. Patent No. 7,706,811 (“Shkedi”)
1007	U.S. Patent No. 9,097,784, issued on August 4, 2015 (“the ’784 Patent”)
1008	U.S. Patent No. 8,406,753, issued on March 26, 2013 (“the ’753 Patent”)
1009	U.S. Patent Application Publication No. 2003/0064735, published on April 3, 2003 (“Spain”)
1010	Jian Zhu and G. D. Durgin, “Indoor/outdoor location of cellular handsets based on received signal strength,” <i>2005 IEEE 61st Vehicular Technology Conference</i> , Stockholm, Sweden, 2005, pp.92-96, Vol. 1, doi: 10.1109/VETECS.2005.1543256 (“Zhu”)
1011	Heikki Laitinen, Jaakko Lähteenmäki, Tero Nordström, “Database Correlation Method for GSM Location”, VTT Information Technology, IEEE, 2001. (“Laitinen”)
1013	<i>Curriculum Vitae</i> of David Hilliard Williams

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Exhibit No.	Description
1016	Complaint dated November 22, 2022, <i>Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.</i> , Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022 (“the Related Litigation”)
1018	U.S. Patent No. 7,561,104 (“the ’104 Patent”)
1019	File History of U.S. Patent Application No. 12/026,333, filed on February 5, 2008 (“the ’333 Application”)
1024	Plaintiff Geoscope Technologies PTE. LTD.’s Opening Claim Construction Brief dated May 26, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.</i> , Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022
1025	Google LLC’s Opening Claim Construction Brief dated May 26, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.</i> , Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022
1027	Appendix B to Plaintiff Geoscope Technologies Pte. Ltd.’s Preliminary Infringement Contentions dated April 7, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.</i> , Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022
1028	Claim Construction Memorandum Opinion & Order dated July 19, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.</i> , Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022

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I, David H. Williams, hereby state as follows:

I. INTRODUCTION

1. I have been retained by Google LLC (“Petitioner”) as an independent expert consultant in this *inter partes* review (“IPR”) proceeding before the United States Patent and Trademark Office (“PTO”).

2. I have been asked by Counsel for Petitioners (“Counsel”) to consider whether certain references teach or suggest the features recited in Claims 1, 15, 18, 41, and 52 (“the Challenged Claims”) of U.S. Patent No. 8,400,358 (“the ’358 Patent”) (EX1001). My opinions and the bases for my opinions are set forth below.

3. I am being compensated at my ordinary and customary consulting rate for my work, which is \$485 per hour. My compensation is in no way contingent on the nature of my findings, the presentation of my findings in testimony, or the outcome of this or any other proceeding. I have no other financial interest in this proceeding.

II. BACKGROUND AND QUALIFICATIONS

4. All of my opinions stated in this declaration are based on my own personal knowledge and professional judgment. In forming my opinions, I have relied on my knowledge and experience in designing, developing, researching, and teaching the technology referenced in this declaration.

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5. I am over 18 years of age and, if I am called upon to do so, I would be competent to testify as to the matters set forth herein. I understand that a copy of my current curriculum vitae, which details my education and professional and academic experience, is being submitted as EX1013. The following provides a brief overview of some of my experience that is relevant to the matters set forth in this declaration.

6. I have over 30 years of experience in wireless location services, including experience implementing Wireless 911 (E911) systems and designing, implementing, and managing numerous location-based service (LBS) applications such as family tracking and fleet and asset management. I am currently the President of the company E911-LBS Consulting, and I have been with the company since 2002. As the President of E911-LBS Consulting, I provide services across the entire wireless value chain, particularly with respect to technology and business strategic planning and product design and development associated with LBS, Global Positioning Satellite (GPS) systems, E911, Real-Time Location Systems (RTLS), Radio Frequency Identification (RFID), beacon, and other location determination and sensing technologies and services.

7. I have extensive expertise in all aspects of LBS delivery across the wireless location ecosystem including enabling network, map data, geospatial platform, chipset, data management, device, and location determination

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infrastructure and integration providers. I am an expert in all related aspects of LBS, including data privacy and security management.

8. For example, I managed the development and launch of several consumer-oriented LBS applications including mobile social networking, family tracking and local search for a major wireless carrier (AT&T). This work included the development of corporate-wide location data privacy policies and their systemic implementation for all LBS customers. My work in both data privacy and mobile social networking resulted in my co-inventing a patent in this field. I also have several other patents related to mobile location and associated applications and architectures.

9. I also have significant experience related to E911 systems. For example, in 2003-2004, I consulted with AT&T Wireless on their implementation of E911 systems. Specifically, I led the development of implementation and monitoring of systems in AT&T Wireless Western Region as part of their deployment of TDOA (Time Difference of Arrival) non-GPS E911 network location infrastructure to meet the wireless E911 location requirements mandated by the FCC. In 2004-2005, I worked with NAVTEQ, a key provider of LBS and E911 location map data, in developing their application developer ecosystem and website, providing developers with access to all of NAVTEQ's product and technical

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resources for developing location-related applications, including data products involving 911 GIS (Geographical Information Systems).

10. I have authored multiple books on wireless location, including:

- The Definitive Guide to GPS, RFID, Wi-Fi, and Other Wireless Location-Based Services (2005 and 2009 versions);
- The Definitive Guide to Wireless E911; and
- The Definitive Guide to Mobile Positioning and Location Management (coauthor).

11. I received a B.S. degree, in Electrical Engineering, from Purdue University in 1983. I received a MBA degree, in Information Systems Management, from The University of Texas at Austin in 1987.

III. INFORMATION CONSIDERED

12. In preparation for this declaration, I have considered the materials discussed in this declaration, including, for example, the '358 Patent, the references cited by the '358 Patent, the prosecution histories of the '358 Patent and applications from which it derives (including the references cited therein), various background articles and materials referenced in this declaration, and the prior art references identified in this declaration. In addition, my opinions are further based on my education, training, experience, and knowledge in the relevant field.

IV. RELEVANT LEGAL STANDARDS

13. I am not an attorney and offer no legal opinions. For the purposes of this Declaration, I have been informed about certain aspects of the law that are relevant to my analysis, as summarized below.

A. Claim Interpretation

14. I have been informed that during an *inter partes* review proceeding, claims are to be construed in light of the specification as would be read by a person of ordinary skill in the relevant art at the time the application was filed. I have been informed that claim terms are given their ordinary and customary meaning as would be understood by a person of ordinary skill in the relevant art in the context of the entire disclosure. A claim term, however, will not receive its ordinary meaning if the patentee acted as his own lexicographer and clearly set forth a definition of the claim term in the specification. In that case, the claim term will receive the definition set forth in the patent.

15. I have been informed that certain patent claim terms may be interpreted as “means-plus-function” claim terms. I have been informed that terminology is part of the U.S. Patent Law in 35 USC §112, paragraph 6 (pre-AIA) / 35 USC § 112(f) (post-AIA), which states the following: “An element in a claim for a combination may be expressed as a means or step for performing a specified function without the

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recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.”

B. Perspective of One of Ordinary Skill in the Art

16. I have been informed that a patent is to be understood from the perspective of a hypothetical “person of ordinary skill in the art” (“POSITA”). Such an individual is considered to possess normal skills and knowledge in a particular technical field (as opposed to being a genius). I have been informed that in considering what the claims of a patent require, what was known prior to that patent, what a prior art reference discloses, and whether an invention is obvious or not, one must use the perspective of such a POSITA.

C. Anticipation

17. I have been informed that a claim is not patentable if it is anticipated. I have been informed that anticipation of a claim requires that every element of a claim is disclosed expressly or inherently in a prior art reference, arranged as in the claim, when considered from the perspective of a person of ordinary skill in the relevant art. I have been informed that when the structure recited in a reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. I have been informed that extrinsic evidence may be used

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to explain but not expand the meaning of terms and phrases used in the reference relied upon as anticipatory of the claimed subject matter.

D. Obviousness

18. I have been informed that a patent claim is obvious under 35 U.S.C. § 103, and therefore invalid, if the claimed subject matter, as a whole, would have been obvious to a POSITA as of the priority date of the patent based on one or more prior art references and/or the knowledge of a POSITA.

19. I have been informed that an obviousness analysis must consider (1) the scope and content of the prior art, (2) the differences between the claims and the prior art, (3) the level of ordinary skill in the pertinent art, and (4) secondary considerations, if any, of non-obviousness (such as unexpected results, commercial success, long- felt but unmet need, failure of others, copying by others, and skepticism of experts).

20. I have been informed that a prior art reference may be combined with other references to disclose each element of the invention under 35 U.S.C. § 103. I have been informed that a reference may also be combined with the knowledge of a POSITA, and that this knowledge may be used to combine multiple references. I have been informed that a POSITA is presumed to know the relevant prior art. I have

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been informed that the obviousness analysis may take into account the inferences and creative steps that a POSITA would employ.

21. In determining whether a prior art reference would have been combined with other prior art or other information known to a POSITA, I have been informed that the following principles may be considered:

- whether the references to be combined involve non-analogous art;
- whether the references to be combined are in different fields of endeavor than the alleged invention in the Patent;
- whether the references to be combined are reasonably pertinent to the problems to which the inventions of the Patent are directed;
- whether the combination is of familiar elements according to known methods that yields predictable results;
- whether a combination involves the substitution of one known element for another that yields predictable results;
- whether the combination involves the use of a known technique to improve similar items or methods in the same way that yields predictable results;
- whether the combination involves the application of a known technique to a prior art reference that is ready for improvement, to yield predictable results;
- whether the combination is “obvious to try”;
- whether the combination involves the known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other

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market forces, where the variations are predictable to a POSITA;

- whether there is some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill in the art to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention;
- whether the combination requires modifications that render the prior art unsatisfactory for its intended use;
- whether the combination requires modifications that change the principle of operation of the reference;
- whether the combination is reasonably expected to be a success; and
- whether the combination possesses the requisite degree of predictability at the time the invention was made.

22. I have been informed that in determining whether a combination of prior art references renders a claim obvious, it is helpful to consider whether there is some teaching, suggestion, or motivation to combine the references and a reasonable expectation of success in doing so. I have been informed, however, that a teaching, suggestion, or motivation to combine is not required.

V. SUMMARY OF OPINIONS

23. It is my opinion that Claims 1, 15, 18, 41, and 52 of the '358 Patent are unpatentable under 35 U.S.C. §103 on the following grounds:

Ground	Reference(s)	Basis	Claims
1	U.S. Patent No. 7,706,811 ("Shkedi") (EX1006)	§102	1, 15, 18

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Ground	Reference(s)	Basis	Claims
2	Shkedi; U.S. Patent Publication No. 2003/0064735 (“Spain”) (EX1009)	§103	18
3	Jian Zhu and G. D. Durgin, “Indoor/outdoor location of cellular handsets based on received signal strength,” <i>2005 IEEE 61st Vehicular Technology Conference</i> , Stockholm, Sweden, 2005, pp.92-96, Vol. 1, doi: 10.1109/VETECS.2005.1543256 (“Zhu”) (EX1010)	§102	1, 15, 18, 41, 52
4	Zhu; Spain	§103	18
5	Zhu; Heikki Laitinen, Jaakko Lähteenmäki, Tero Nordström, “Database Correlation Method for GSM Location”, VTT Information Technology, IEEE, 2001 (Laitinen)	§103	52
6	Shkedi; Zhu	§103	41, 52

VI. TECHNOLOGY BACKGROUND

24. The ’358 Patent discloses a method to modify calibration data used to locate a mobile unit (*e.g.*, mobile phone) in an indoor facility by modifying observed network measurement data. EX1001, 3:45-49, 1:19-23. “Calibration data obtained outdoors may be modified and substituted for indoor calibration data” and “network measurement data may be modified for comparison with the outdoor calibration data.” *Id.*, 3:53-56. Patent Owner (“Owner”) asserts that modification of observed network measurement data constitutes the purported “inventive feature” of the ’358

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Patent. EX1016, ¶54. This purported “inventive feature” was disclosed in prior art, demonstrating it was well known to modify (*e.g.*, normalize) observed data and use the modified data to determine a mobile station’s location. *See, e.g.*, EX1006, 5:59-63, 21:14-24; EX1010, pp.94-95.

VII. THE CHALLENGED ’358 PATENT

25. The ’358 Patent contains 52 claims. I have been asked to opine on the validity of Claims 1, 15, 18, 41, and 52.

VIII. THE ’358 Patent PROSECUTION HISTORY

26. I have reviewed the file history of the ’358 Patent. During prosecution, the Patent Office made a rejection based on Krumm, Stilp, or Schantz. EX1002, pp.175-180 (Office Action dated Jun. 17, 2011). Applicant argued that the applied art does not “teach or disclose collecting observed network measurement data (*e.g.*, from NMRs), modifying the observed network measurement data and comparing the modified network measurement data with a database of calibration data to determine the location of a mobile station.” *Id.*, p.171; pp.167-172 (response filed Jul. 19, 2011 at pp.3-5). The Examiner withdrew the rejection in the next action without explanation. The application was allowed without reasons for allowance.

27. The parent (U.S. Patent No. 7,561,104, EX1018) was allowed in the first action. EX1019, pp.31-36 (Office Action dated Feb. 25, 2009). Reasons for

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allowance stated that “the examiner found no teaching in the prior art that would render obvious the claimed method for determining a location of a mobile station comprising ‘determining which of said first and second signal characteristics has a greater magnitude; and modifying said observed network measurement data using the greater magnitude signal characteristic’.” *Id.*, p.11; pp.7-16 (Allowance dated May 29, 2009).

28. The '104 Patent was subject to reexamination ('694 Reexam). Claims 1-14 were confirmed without amendment and claims 15-21 were canceled as a result. EX1004. *See also* EX1003, 4-10 (NIRC dated Jul. 23, 2014). The Examiner's statement of reasons for patentability/confirmation indicated that “Benes fails teaching comparing the modified network measurement data with the calibration data”. *Id.*, 7 (NIRC dated Jul. 23, 2014 at 3). The Examiner determined that “Gordon does not explicitly teach that it is determined which signal has a greater magnitude and then using the greater magnitude signal to modify observed measurement data”. *Id.*

29. The prior art newly relied upon in the present IPR discloses the features alleged to be missing from the art applied during prosecution of the '320 and '333 Applications and the '694 Reexam. *See* Section XIII.

IX. LEVEL OF ORDINARY SKILL IN THE ART

30. A POSITA would have been someone knowledgeable in wireless networks, cellular radio systems, mobile communication devices and radio navigation systems. That person would have at least a bachelor's degree in electrical engineering, with a background in radio frequency communications and/or navigation system technology as well as approximately two years of industry experience working on radio communication and/or navigation systems.

X. PRIORITY DATE

31. I have been informed that the “priority date” or “earliest effective filing date” of a patent is the date on which it is filed, or the date on which an earlier-filed U.S. or international patent application was filed if the patentee claims the benefit of priority to that earlier-filed U.S. or international patent application. The '358 Patent issued from U.S. Patent Application No. 12/424,320, filed on April 15, 2009, which is a continuation of U.S. Patent Application No. 12/026,333, filed on February 5, 2008 (US Patent 7,561,104), which claims priority to U.S. Provisional Application No. 60/899,379, filed on February 5, 2007. For purposes of this declaration, I have assumed that the '358 Patent is entitled to a priority date of February 5, 2007, and I have not evaluated or formed an opinion on whether the claims of the '358 Patent are actually entitled to that date.

XI. CLAIM CONSTRUCTION

32. For purposes of my analysis in this IPR proceeding, I have been informed that terms that appear in the claims of the '358 Patent should be interpreted according to their plain and ordinary meaning under the *Phillips* standard. In determining the ordinary and customary meaning, I have been informed that the words of a claim are first given their plain meaning that those words would have had to a POSITA at the time of the alleged invention. I also have been informed that the claims, specification, and file history may be used to better construe a claim insofar as the plain meaning of the claims cannot be understood. I have been informed that even treatises and dictionaries may be used under limited circumstances to determine the meaning attributed by a POSITA to a claim term at the time of filing.

33. I also understand that, for terms that evoke a means plus function construction, “the construction of the claim must identify the specific portions of the specification that describe the structure, material, or acts corresponding to each claimed function.” 37 C.F.R. §42.104(b)(3). I understand from counsel that construing a means-plus-function claim term is a two-step process that includes (1) identifying the claimed function and (2) then determining what structure, if any, disclosed in the specification corresponds to the claimed function.

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34. I have reviewed the '358 Patent and its prosecution history as well as additional documents to construe the claims for performing my validity analysis. It is my understanding that some terms of the '358 Patent are in dispute and a Markman Order (EX1028) issued in Related Litigation addressing those disputes construing claim terms. Below is a summary of claim constructions I have made for purposes of evaluating the Challenged Claims of the '358 Patent.

A. “calibration data”

35. I have construed the phrase “calibration data” as modified or unmodified network measurement data associated with a geographic location.

36. This construction is consistent with the Markman Order. *See* EX1028, p.8.

37. The '358 Patent discloses that signal strength is a type of calibration data. EX1001, 1:27-30 (“one or more types of calibration data associated with the mobile station (e.g., signal strength, ...”). *See also id.*, 1:45-46 (“signal strength data stored in a calibration database”). Thus, the term “calibration data” should be construed to encompass signal strength measurements.

38. The '358 Patent discloses that “calibration data” encompasses data that has been modified. EX1001, 3:53-54 (“Calibration data obtained outdoors may be modified and substituted for indoor calibration data.”); *see also id.*, 14:38-40

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(“wherein the modifying of said calibration data...”). The ’358 Patent is entitled “Method *to modify calibration data* used to locate a mobile unit”.

B. “observed network measurement data”

39. I have construed the phrase “observed network measurement data” as measurement data from a network measurement report (i.e., a report used in cellular networks which provides the results of a measurement from a mobile device on one or more cells).

40. This construction is consistent with the Markman Order. *See* EX1028, p.10.

C. “grid point”

41. I have construed the phrase “grid point” as a point associated with representative calibration data for an area.

42. This construction is consistent with the Markman Order. *See* EX1028, p.20.

D. “positioning determining equipment”

43. It is my understanding that, in Related Litigation, Owner construes this term as “equipment that processes received information to locate a position of a mobile device,” where 35 U.S.C. §112, paragraph 6 / 35 U.S.C. §112(f) does not apply. EX1024, 12. Owner asserts that “[s]hould 35 U.S.C. §112 ¶ 6 apply”, the function is “comparing said modified network measurement data with said database

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of calibration data to thereby determine the location of the mobile station” and the structure is “a processor, microprocessor or ASICS, including but not limited to those implementing the algorithms of Figs. 2/3, 7-10, specifically steps 202-203, 303, 304, 307, 309, 707, 807, 909, 1005, 1007, 1009, and described textually at 2:12-14, 2:24-28, 2:38-40, 2:63-67, 3:2-13, 4:49-61, 6:20-21, 6:60-62, 7:44-48, 8:4-9:16, 9:26-34, 9:35-50, 9:58-64, 10:3-8, 11:13-17, 11:29-31, 11:40-44 and 11:50-61, and structural equivalents.” EX1024, 12.

44. It is my understanding that, in Related Litigation, the District Court determined this term is indefinite. *See* EX1028, pp.11-16. It is also my understanding that Petitioner does not directly construe this term for this Petition. Petitioner recognizes that this term encompasses the prior art of record, although the bounds of the term are not reasonably certain.

45. It is my understanding that, in Related Litigation, Petitioner asserts that this phrase is subject to 35 U.S.C. §112 ¶ 6 wherein the function is “comparing said modified network measurement data with said database of calibration data”. EX1025, 8. For purposes of compliance with 37 C.F.R. § 42.104(b)(3) in this IPR, Petitioner identifies as the structure “circuitry, such as a processor, for comparing the modified data with the calibration data”. *See, e.g.*, EX1001, 1:66-2:3.

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46. In Related Litigation, Petitioner asserts that the phrase “positioning determining equipment” is indefinite for failing to disclose adequate structure in the specification of the ’358 Patent. EX1025, 8-12. The Board has consistently held that Petitioners may assert indefiniteness positions in parallel litigation, while simultaneously arguing that the prior art discloses the elements containing those terms. *See Target Corp. v. Proxicom Wireless, Inc.*, IPR2020-00979, Paper 11 at 16-17 (PTAB Dec. 4, 2020); *Sony Interactive Entertainment LLC v. Bot M8, LLC*; IPR2020-00963, Paper 9 at 11 (PTAB Nov. 20, 2020). *See also Intel Corp. v. Qualcomm Inc.*, 21 F.4th 801, 812-814 (Fed. Cir. 2021). The Challenged Claims are unpatentable under all the potential constructions discussed above.

E. The steps of “collecting...,” “modifying...,” and “comparing...” Occur in This Stated Order

47. I am aware that, in the Related Litigation, Petitioner and Owner have stipulated that the order of “collecting...”, “modifying...”, and “comparing...” steps of claim 1 should be construed as “collecting has to occur before modifying, and modifying has to occur before comparing.” EX1024, p.1. The Grounds of invalidity address this construction.

XII. OVERVIEW OF THE PRIOR ART REFERENCES

A. Shkedi (EX1006)

48. Shkedi discloses determining the location of a mobile telephone using a “Signal-Comparison Based Location-Determining Method” to address a need “for simple straightforward improvements in determining the precise location of mobile devices; especially in poor signal-reception locations such as in dense multi-story urban centers” and “locat[ing] a device in a multi-story structure.” EX1006, 1:23-27, 6:35-7:5.

49. Shkedi’s method includes: (A) registering a selected location by first-causing a portable RF communications device at the selected location to receive an RF communications signal from a plurality of local fixed-location service-area antenna stations; (B) recording the selected location by electronically storing at least two of the respective reception signal strength measurements; (C) monitoring by second-causing a portable RF communications device to receive communications signals from a plurality of respectively local fixed-location service-area antenna stations, and to measure reception signal strength associated with the signals; and (D) determining if the portable RF communications device is at the selected location of the registering step by electronically comparing measurements in the monitoring step with the stored at least two measurements of the recording step. EX1006, 5:36-63.

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50. Observed network measurement data is modified by replacing direct measurements with relative/normalized measurements using a strongest signal. *Id.*, 6:12-34. Shkedi also modifies observed network measurement data by performing mathematical operations on the “less strong” signals using the strongest signal. *See id.*, 20:63-21:61. The resulting modified data is used to determine the location of the mobile station. *Id.*, 5:59-63, 21:14-24. Shkedi’s method is performed on a single mobile device, on separate devices, or in offsite facilities. *Id.*, 12:12-18. *See also id.*, 23:55-57.

B. Zhu (EX1010)

51. Zhu discloses determining indoor/outdoor locations of cellular handsets by using “received signal strength (RSS) methods for locating wireless handset calls in a real cellular environment”. EX1010, abstract, title. “The RSS technique estimates a cellular phone’s location by matching signal strengths measured at the handset with signal strengths recorded in a database of radio frequency (RF) maps.” *Id.*, p.92, left col. Zhu’s methods are “for identifying and locating indoor handsets”. *Id.*, abstract (emphasis in original). *See also id.*, p.92, left col. (“we conclusively show that RSS location techniques are also accurate for indoor users”), p.93, left col. (“we were concentrating on the more complicated question of indoor feasibility”).

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52. A location algorithm receives a calibrated RF Map Database (“RFMD”) and a sequence of network measurement reports (“NMRs”). EX1010, p.94, right col. NMR reports include signal strength data of the cellular phone to be located. Zhu discloses “normaliz[ing]” NMR data using signal strength data “to generate the relative received signal strength”. EX1010, p.95, left col. *See also id.*, paragraph bridging pp.94-95. The “N strongest channels” or “six strongest channels” (e.g., 6 signals of greater magnitude) are selected from the observed network measurement data and used to calculate an average received signal strength. EX1010, p.94, right col.

C. Spain (EX1009)

53. Spain discloses interpolating grid points between existing grid points to improve the accuracy of an RF-based fingerprint database built using NMRs and observed network measurement data (i.e., RF “fingerprint” measurement data that can identify a mobile device location). EX1009, [0101]:1-4 (“the database is built by taking fingerprint measurements at predetermined locations and using intelligent algorithms that interpolate the fingerprints at all locations in between the sampled locations”). *See also id.*, [0054]:1-3 (“To improve the accuracy of the fingerprint database, learning/training techniques and methodologies can be adopted for this problem.”), [0055]:6-10.

D. Laitinen (EX1011)

54. Laitinen is entitled “Database Correlation Method for GSM Location”.

Laitinen discloses that fingerprint data may consist of signals obtained from various networks. EX1011, p.2505, Fig. 1. Laitinen discloses the general architecture of database correlation methods used with GSM. EX1011, Fig. 1. Laitinen discloses that “it is possible to use measurements performed by the network as well as by the MS”, “[w]hen the MS needs to be located, the necessary measurements are performed and transmitted to the location server”, and “[t]he location server then calculates the MS location by comparing the transmitted fingerprint and the fingerprints of the database.” *Id.*, p.2505, left col.

**XIII. DETAILED EXPLANATION OF THE UNPATENTABILITY
GROUNDS**

A. Claims 1, 15, and 18 Are Anticipated By Shkedi (Ground 1)

55. In my opinion, the Challenged Claims are unpatentable over the prior art.

56. The following sections provide reference to where the elements of Claims 1, 15, and 18 are found in the prior art and explain why such claims are anticipated.

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1. Preamble of Claim 1 is Disclosed in Shkedi

57. The Preamble of Claim 1 recites “[a] method for determining a location of a mobile station, comprising.”¹ Shkedi discloses the Preamble of Claim 1.

58. Shkedi discloses “methods for determining the location of a mobile telephone, or of a mobile communications device.” EX1006, 1:6-15. *See also id.*, 1:19-21. Shkedi discloses a “Signal-Comparison Based Location-Determining Method” and system. *Id.*, 6:35-7:5, 14:41-15:5, Fig. 6. Shkedi refers to the device to be located as a “mobile telephone”, “mobile communications device”, “portable RF communications device”, “cellular telephone device”, and “portable device”. *Id.*, 1:6-8, 5:36-43, 6:35-40, 6:2-3. Each satisfies the claimed “mobile station”. The ’358 Patent discloses that a mobile station encompasses a wireless communication device such as telephones. EX1001, 1:18-22.

59. The Challenged Claims encompass observed network measurement data collected by a mobile station located indoors. Shkedi’s techniques are suitable for “locat[ing] a device in a multi-story structure.” EX1006, 1:23-29. Shkedi’s techniques address the need for locating mobile devices “especially in poor signal-

¹ It is my understanding that Petitioner does not concede that the Preamble is limiting.

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reception locations such as in dense multi-story urban centers.” *Id.*, 1:23-29. *See also id.*, 5:27-30 (problem of poor signal-reception is “significantly addressed by embodiments of the present invention”). Shkedi therefore discloses applying its techniques to determine the location of a mobile device located indoors.

60. Accordingly, Shkedi discloses the Preamble of Claim 1.

a. Element [1.1] is Disclosed in Shkedi

61. Element [1.1] recites “providing a database of previously-gathered calibration data for a predetermined region in a wireless network.” Shkedi discloses Element [1.1].

62. Shkedi discloses registering and recording a selected location “by electronically storing at least two of the respective signal strength measurements”. EX1006, 5:44-50. Shkedi discloses registering and recording multiple desired locations in constructing its database. *Id.*, 18:31-33 (“there is no limit on the number of desired locations that could be recorded and tracked by the cellphone.”), 13:64-14:7 (“Database recorded on a tangible memory media...and having recorded thereon signal-strength location correlation data”). This database of previously-gathered signal strength measurements is used for comparison purposes to locate the mobile device. *Id.*, 5:59-63. *See also id.*, 8:41-56, 6:35-7:5.

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63. Shkedi discloses that signal strength measurements for a selected location are registered “by first causing a portable RF communications device at the selected location (i) to receive an RF communications signal from a plurality of local fixed-location service-area antenna stations, and (ii) to measure reception signal strength respectively associated with the received signal from at least two of the plurality of antenna stations.” EX1006, 5:44-50.

64. Shkedi discloses that the database is generated from this “data collection step where the portable device comes to measure the antenna signal space reception characteristics at the selected location.” *Id.*, 11:26-28.

65. Shkedi discloses “[r]ecording the selected location by electronically storing at least two of the respective reception signal strength measurements. Storage may be on the device per se or transferred to a remote storage facility.” EX1006, 11:39-42.

66. Shkedi’s registered and recorded signal strength measurements for selected locations satisfy “calibration data”. Such signal strength measurements constitute “modified or unmodified network measurement data associated with a geographic location” (*see* Section VI.A.) given that the signal strength measurements are associated with selected locations and are received from network antenna stations as a report (*e.g.*, at least two of the signal strengths measurements).

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67. Shkedi discloses “(A) Registering” and “(B) Recording” prior to “(C) Monitoring” and prior to “(D) Determining ... by electronically comparing measurements”. EX1006, 5:44-63. Shkedi’s database of signal strength data is for a region encompassing the “selected location[s]” for which the signal strength data is registered and recorded. *Id.*, 5:44-53. Shkedi’s database of signal strength data is associated with the “service-area” of “antenna stations” of a “cellular network”, *e.g.*, “in a typical GSM implementation and a typical CDMA implementation.” *Id.*, 5:36-50, 18:5-17, 19:39-41.

68. Shkedi discloses that the network includes a first transmitter and a second transmitter which provide calibration data and observed network measurement data. EX1006, 5:44-50 (“a plurality of local fixed-location service-area antenna stations”), Fig. 2. *See also id.*, 5:36-42 (the location-determining method is “operable by at least one portable RF communications device in conjunction with at least two fixed-location service-area antenna stations respectively capable of RF communication with the at least one device”), 25:61-67.

69. Accordingly, Shkedi discloses each and every limitation of Element [1.1].

b. Element [1.2] is Disclosed in Shkedi

70. Element [1.2] recites “collecting observed network measurement data.” Shkedi discloses Element [1.2].

71. Shkedi discloses “(C) Monitoring ... a portable RF communications device (i) to receive communications signals from a plurality of respectively local fixed-location service-area antenna stations, and (ii) to measure reception signal strength associated with the signals”. EX1006, 5:54-58.

72. Shkedi “receive[s]” communications signals from the cellular network and measures reception signal strengths to generate “unique fingerprints” (*i.e.*, network measurement reports (NMRs)). *Id.*, 16:19-22 (“the combination of measured signal strengths from surrounding cells ... as measured by the cell phone at a certain location creates a unique fingerprint.”).

73. Shkedi “currently records” the unique fingerprint created from the measurements. *Id.*, 9:33-34. Shkedi “collects” communications signal “data” from the unique fingerprints (*i.e.* NMRs) that are “monitored” (*i.e.*, “observed”) by the mobile station. *Id. See also id.*, 11:60-63 (“the monitoring step collects sparse first order data, and then collects more comprehensive data for the next step”), 8:41-48 (mobile telephone “observ[es] an identical list of service antennas with substantially identical respective signal strengths”).

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74. Shkedi's collected communications signal data constitute "measurement data from a network measurement report (*i.e.*, a report used in cellular networks which provides the results of a measurement from a mobile device on one or more cells)" (*see* Section VI.B.) given that Shkedi's mobile station measures signals from the cellular network to form unique fingerprints and collects measurement data from the unique fingerprints (*i.e.*, reports used in cellular networks to provide results of a measurement). EX1006, 6:19-27, 6:35-36 ("cellular telephone device"), 17:24-28 ("measurements are from the perspective of the location of the reception device (the cellular telephone, ubiquitous computer, etc.) and substantially form a instance of an antenna space reception fingerprint".), 18:5-12.

75. Shkedi discloses receiving a "unique fingerprint" (*i.e.*, NMR) and collecting observed network measurement data. Shkedi "measures 10 signals from 10 surrounding cells" to generate an original unique fingerprint (*i.e.*, original NMR). Shkedi then collects observed network measurement data from the unique fingerprint by "choos[ing] the 4 cells with the strongest signals as neighboring cells" to form a modified fingerprint (*i.e.*, modified NMR). EX1006, 20:66-21:2, *see also* 20:63-21:24.

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76. Shkedi discloses implementing its technique using software and circuitry for performing the collecting step. EX1006, 14:41-15:5 (registration, recording, monitoring, and determination modules 600, 610, 620, 630), 25:32-39 (mobile telephone device has “reasonable amount of spare computing power onboard”), 14:8-40 (“computer usable medium having computer readable program code”), 11:12-17, 2:61-67 (cell phone contains “location monitoring logic”).

77. The ’358 Patent discloses that “network measurement data represents at least one network characteristic observed by the mobile station” (EX1001, 9:55-58).

78. Shkedi’s communications signal data collected from reception signal strength measurements during the monitoring step (C) represent signal strengths observed by the mobile station.

79. The signal strength measurements collected in Shkedi’s monitoring step (C) satisfy a “first signal characteristic” and “second signal characteristic”.

80. The term “signal characteristic” encompasses signal strength measurements according to the ’358 Patent. EX1001, 14:31-32 (“said first signal characteristic is signal strength.”), 14:36-37 (“said second signal characteristic is signal strength.”). *See also id.*, 6:1-4.

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81. Shkedi's (first and second) communication signals and associated (first and second) signal strength measurements are respectively received from the same "plurality of local fixed-location service-area antenna stations" as unique fingerprints used in the previous step of registering and recording the database of previously-gathered signal strength data. EX1006, 5:36-42 (steps (A)-(D) are "operable by at least one portable RF communications device in conjunction with at least two fixed-location service-area antenna stations respectively capable of RF communication with the at least one device"), 25:61-67 ("measure reception signal strength associated with the received signal from at least two of said first plurality of antenna stations") 11:57-58, Fig. 2.

82. Thus, Shkedi's first and second signal strength measurements are from the first and second antenna stations (first and second transmitters), respectively, and Shkedi's signal strength measurements constitute data representing a signal characteristic of a transmitter in the wireless network.

83. Thus, Shkedi discloses that the network includes a plurality of transmitters which provide calibration data and observed network measurement data. EX1006, 5:44-50 ("a plurality of local fixed-location service-area antenna stations"), Fig. 2. *See also id.*, 5:36-42 (the location-determining method is "operable by at least one portable RF communications device in conjunction with at least two fixed-

location service-area antenna stations respectively capable of RF communication with the at least one device”), 25:61-67.

84. Shkedi’s signal strength measurements collected during the monitoring step (C) are compared with the database of previously-gathered signal strength measurements collected in Steps (A) and (B) to locate the portable device. *Id.*, 5:35-63. *See also id.*, 8:41-56, 6:35-7:5.

85. Accordingly, Shkedi discloses each and every limitation of Element [1.2].

c. Element [1.3] is Disclosed in Shkedi

86. Element [1.3] recites “modifying said observed network measurement data.” Shkedi discloses Element [1.3].

87. Shkedi’s techniques involve modifying said observed network measurement data using the greater magnitude signal characteristic: normalizing signal strengths using the “strongest signal” (*see* EX1006, 6:12-34), “dividing the 3 less strong signals by the strongest signal” (*see id.*, 21:2-5, 21:11-14), and determining whether a signal strength “is only slightly stronger” than another signal strength and dividing “by the sum of the signals of the 2 strongest cells” (*see id.*, 21:49-58).

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88. Shkedi satisfies the order of “collecting...” “modifying...” and “comparing...” steps (*see* Section VI.E.). Shkedi “collects” the observed network measurement data prior to “modifying” the same and the modification results in modified network measurement data. Shkedi “modifies” prior to “comparing” the modified network measurement data with the database of calibration data.

89. Shkedi discloses using the “strongest signal...to help normalize” (*i.e.*, “modify”) direct signal strength measurements including the signal strength measurements of the signal data collected in Shkedi’s monitoring step which corresponds to the claimed observed network measurement data.

90. The ’358 Patent discloses that modifying encompasses employing normalized/relative signal strengths. *See, e.g.*, EX1001, 6:1-4 (“NM data may be modified by an amount relative to the signal strength of a NC-BS. In this example, the NC-BS having the highest signal power may be used as a basis to modify the values of the NM data.”).

91. Like Shkedi, the ’379 Provisional—which the ’358 Patent incorporates by reference (EX1001, 1:6-15)—discloses using “relative received signal strengths” instead of “absolute received signal strengths”. EX1005, pp.25-26 (“absolute received signal strength comparisons between the wireless device and a calibration database may result in poor location estimation accuracy. In the following methods,

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instead of comparing absolute received signal strengths, a comparison of relative received signal strengths, obtained by various modifications, is proposed.”). *See also* EX1003, p.89 (Owner conceded that normalization is a modification) (Response filed Dec. 24, 2013, at p.13).

92. Shkedi discloses modifying the signal strength data “by dividing the 3 less strong signals by the strongest signal”. EX1006, 21:2-5, 21:11-14. The 3 relations are recorded and compared with previously gathered calibration data to determine the location of the cell phone. *Id.*, 21:2-5. Shkedi discloses calculating the same “relations” between the signals, *i.e.*, by dividing the 3 “less strong” signals by “the strongest signal”.

93. Shkedi modifies signals that the mobile station monitors (*i.e.*, the observed network measurement data) using the “strongest signal” among the signals the mobile station monitors. The ’358 Patent discloses that performing mathematical operations (*e.g.*, division) on the “less strong” signals using “the strongest signal”. *See* EX1001, 7:7-10.

94. Shkedi also discloses comparing the two signal strengths of the two strongest cells of the observed network measurement data to determine whether they are “close enough in strength” to warrant using the sum of the signals of the two strongest cells as the divisor. EX1006, 21:49-58.

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95. The two signal strengths of the two strongest cells (which includes “the greater magnitude signal characteristic”) are then used to modify the weaker signal strengths (*i.e.*, “observed network measurement data”) by dividing the weaker signals by the sum of the two strongest signal strengths. *Id.*, 21:54-61 (“cell #6 signal/(cell #4 signal+cell #1 signal)”, “cell #9 signal/(cell #4 signal+cell #1 signal)”).

96. Shkedi uses software and circuitry for modifying data. EX1006, 14:41-15:5 (registration, recording, monitoring, and determination modules 600, 610, 620, 630), 25:32-39 (mobile telephone device has “computing power onboard”), 14:8-40 (“computer usable medium”), 11:12-17, 2:61-67 (cell phone contains “location monitoring logic”), 20:66-21:24 (“The cell phone calculates the ratio...”).

97. Accordingly, Shkedi discloses each and every limitation of Element [1.3].

d. Element [1.4] is Disclosed in Shkedi

98. Element [1.4] recites “comparing said modified network measurement data with said database of calibration data by positioning determining equipment to thereby determine the location of the mobile station.” Shkedi discloses Element [1.4].

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99. Shkedi discloses “embodiments of a ***Signal-Comparison Based Location-Determining Method***”. EX1006, 5:36-37 (emphasis added).

100. Shkedi discloses “[d]etermining if the portable RF communications device of the Monitoring step is at the selected location of the registering step by electronically ***comparing*** measurements in the monitoring step with the stored at least two measurements of the Recording step.” *Id.*, 5:59-63.

101. Shkedi discloses that “[s]ince the device is capable of receiving and measuring such signals, the device simply performs such reception measurements and ***compares*** these measurements [or modified data obtained from such measurements] with the remembered signal strength combinations [*i.e.*, ‘database of previously-gathered calibration data’]” to determine the location of the device. *Id.*, 6:47-55. *See also id.*, 8:41-48 (“if a mobile telephone (at a user selected location) measures a plurality of service antenna signals and stores these with their respective service antenna identifications, then that mobile telephone (or an equivalent unit) upon observing an identical list of service antennas with substantially identical respective signal strengths—can reasonably conclude that it is within a predetermined proximity of the original user selected location.”).

102. Shkedi’s comparing is performed by “by positioning determining equipment” (*e.g.*, the mobile station and/or offsite facilities). EX1006, 6:47-55 (“the

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device simply performs such reception measurements and compares these measurements with the remembered signal strength combinations.... [T]he device can conclude that it is probably at the original location....”), 12:12-18 (“Determining is done in a different offsite facility”). 23:55-57 (“any or all of the steps may be performed from the perspective of service area antenna(s) coordinated by server communications there between.”), 30:21-28.

103. Circuitry, such as a processor, is included for comparing the modified data with the calibration data given that Shkedi teaches use of “software enabling the comparative conclusion” and a module “that can store data and can logically and mathematically compare values and therewith arrive at a comparative conclusion between two sets of data”. EX1006, 11:12-17. *See also id.*, 25:32-39 (mobile telephone device has “reasonable amount of spare computing power onboard”), 14:8-40 (“computer usable medium having computer readable program code”), 2:61-67 (cell phone contains “location monitoring logic”).

104. Shkedi’s location determination method including data comparison is implemented using circuitry such as a processor. It is my understanding that Owner asserts that its list of purported algorithms is non-limiting. EX1025, p.12. Shkedi discloses the purported algorithm of Fig. 2, step 202 (“Comparing the Network Measur[e]ment Data to a Calibration Database”) and step 203 (“Estimating the

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Location of the Mobile Station Based on the Comparison”) as well as Fig. 7, step 707 (“Comparing the Modified Network Measurement Data to the Database of Calibration Data to Locate the Mobile”) of the ’358 Patent. Shkedi also discloses equipment for determining mobile station location.

105. Thus, Shkedi discloses “by positioning determining equipment” under any of the constructions proposed in Related Litigation for the reasons discussed herein concerning Elements [1.1] to [1.3].

106. Shkedi provides a database of previously-gathered calibration data, collects observed network measurement data, and modifies the observed network measurement data, resulting in modified network measurement data.

107. In each of Shkedi’s techniques the resulting modified network measurement data is then compared with the database of previously-gathered calibration data for the purpose of determining the location of the mobile station. *See* EX1006, 6:12-55, 11:2-17, 13:50-63, 15:33-16:23.

108. Shkedi expressly teaches that “it is the relative signal strengths that form an important metric *for comparative purposes*” and the “strongest signal may be used as a unit to help normalize other simultaneous measurements”. EX1006, 6:19-29 (emphasis added). Thus, Shkedi discloses that the relative/normalized data obtained in technique (1) (*i.e.*, the “modified network measurement data”) is then

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compared with the database of previously-gathered calibration data for the purpose of determining the location of the mobile station. *Id.*, 5:59-63 (“**electronically comparing** measurements in the monitoring step with the stored at least two measurements of the Recording step”) (emphasis added), 5:26-43 (“**Signal-Comparison** Based Location-Determining Method”, “for location determination”) (emphasis added).

109. Shkedi discloses that the modified network measurement data (*e.g.*, the “relations”) are compared with the “relations” of the database of previously-gathered calibration data to determine the location of the mobile station. EX1006, 20:27-43 (“by calculating the relations between the measured signal strengths of neighboring cells, a cellphone can identify that it returned to a desired location **by comparing** the calculated relations between neighboring cells at current location with the calculated relations between neighboring cells at the desired location.”) (emphasis added). *See also id.*, 21:14-25 (“The cellphone can determine that it has returned to the desired location or to an area close enough to be considered the desired location by subtracting each of the relations at the current location from each of the corresponding relations at the desired location and demanding that the each of the subtraction for each of the relations does not exceed a certain threshold or that the

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sum of the subtractions does not exceed a certain threshold or alternatively any other formula.”).

110. A POSITA would have recognized that the subtraction and checking against a threshold constitutes a “comparison”.

111. “Calibration data” encompasses data that has been modified. The “relations” obtained from previous direct measurements in Shkedi’s techniques satisfy the database of previously-gathered calibration data.

112. Shkedi discloses implementing its technique using software and circuitry for performing the collecting step. EX1006, 14:41-15:5, 11:12-17.

113. Accordingly, Shkedi discloses each and every limitation of Element [1.4].

114. Thus, Shkedi discloses each and every limitation of Claim 1.

2. Preamble of Claim 15 Disclosed in Shkedi

115. The Preamble of Claim 15 recites “[a] system for determining a location of a mobile station, comprising.”² Shkedi discloses the Preamble of Claim 15 for at least the reasons discussed with respect to the Preamble of Claim 1. *See* Claim 1, Section XIII.A.1.

² It is my understanding that Petitioner does not concede that the Preamble is limiting.

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116. Accordingly, Shkedi discloses the Preamble of Claim 15.

a. Element [15.1] is Disclosed in Shkedi

117. Element [15.1] recites “a database of previously-gathered calibration data for a predetermined region in a wireless network.” Shkedi discloses Element [15.1] for at least the reasons discussed with respect to Element [1.1]. *See* Element [1.1], Section XIII.A.1.a.

118. Accordingly, Shkedi discloses each and every limitation of Element [15.1].

b. Element [15.2] is Disclosed in Shkedi

119. Element [15.2] recites “circuitry for collecting observed network measurement data.” Shkedi discloses Element [15.2] for at least the reasons discussed with respect to Element [1.2]. *See* Element [1.2], Section XIII.A.1.b. Accordingly, Shkedi discloses each and every limitation of Element [15.2].

c. Element [15.3] is Disclosed in Shkedi

120. Element [15.3] recites “circuitry for modifying said observed network measurement data.” Shkedi discloses Element [15.3] for at least the reasons discussed with respect to Element [1.3]. *See* Element [1.3], Section XIII.A.1.c. Accordingly, Shkedi discloses each and every limitation of Element [15.3].

d. Element [15.4] is Disclosed in Shkedi

121. Element [15.4] recites “circuitry for comparing said modified network measurement data with said database of calibration data to thereby determine the location of the mobile station.” Shkedi discloses Element [15.4] for at least the reasons discussed with respect to Element [1.4]. *See* Element [1.4], Section XIII.A.1.d. Accordingly, Shkedi discloses each and every limitation of Element [15.4].

3. Claim 18 is Disclosed in Shkedi

122. Per Section XIII.A.2., Claim 15 is disclosed by Shkedi.

123. Claim 18 recites “[t]he system of claim 15 wherein said database comprises previously-gathered calibration data for one or more non-uniform grid points within said region.” Shkedi discloses the subject matter of Claim 18.

124. “Non-uniform grid points” of the ’358 Patent, as described more fully in the ’753 Patent (EX1008) which claims priority to a common provisional application (EX1005), are grid points “non-uniformly spaced throughout a geographic region.” EX1008, 9:41-42. The ’358 Patent suggests “a non-uniform grid point (NUG) may represent the signal characteristics and/or calibration data over a given region.” EX1001, 3:57-59; *See also* Section XI.C.

125. Shkedi discloses a database including such non-uniform grid points.

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126. Shkedi discloses “Registering” and “Recording” non-uniform locations of a mobile telephone as signal strength measurements in a database (*see, e.g.*, EX1006, 5:44-50). Shkedi discloses updating that database with measurements made during “Monitoring” of the mobile telephone’s location. *See id.*, 11:51-12:5,14:1-7. *See* Section VII.A.1.a, *supra*; (“there is no limit on the number of desired locations that could be recorded”. EX1006, 18:31-33). *See also*, EX1006, 14:1-7.

127. Shkedi states that “a mobile telephone (at a user selected location) measures a plurality of service antenna signals” (*i.e.*, signal strengths) and stores them in a database. *Id.*, 8:41-44. An “identical list of service antennas with substantially identical respective signal strengths” can be used to locate a mobile telephone “within a predetermined proximity of the original user selected location.” *Id.*, 8:44-48. Non-uniform user locations stored in Shkedi’s database are “point[s] associated with representative calibration data for an area [*e.g.*, within a predetermined proximity].” These signals strengths are thus used as signal strengths for determining any user selected location that is “non-uniformly spaced throughout a geographic region.”

128. Shkedi builds the database as a “transformational data bank” of non-uniform grid points “by collecting correspondences between GPS (latitude

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longitude) coordinates” and the signal strengths for the user selected locations. A “never registered location” is found by “extrapolating” to find locations failing “to report GPS.” *Id.*, 13:15-23. Such locations, when extrapolated, constitute non-uniform grid points that are used to “build” Shkedi’s database for location determination. EX1006, 17:44, *see* 13:9-25.

129. Shkedi expressly “builds” the database using non-uniform grid points. “[G]round truth” is measured to “locate shadow spots”. An “accumulation of GPS coordinates in association with location fingerprints” provides “transformations between fingerprints and standard geographical map coordinates [*e.g.*, grid points]—via an intermediate fingerprint ‘terrain’ map database.” EX1006, 9:19-25. This database of non-uniform grid points reduces computation for location determination. *See id.*, 5:4-23.

130. Shkedi also discloses obtaining non-uniform locations within buildings where “GPS signals” are unavailable. *Id.*, 17:43-45. Such locations are recorded in Shkedi’s database; these non-uniform grid points represent non-uniform locations of the buildings. *See id.*, 10:37-63, 14:1-7.

131. Shkedi’s database of non-uniform grid points (*Id.*, 14:1-7) is built from (1) extrapolation of collected “correspondence data” and/or (2) measuring of signal strengths to “fill in the map” (EX1016, ¶61) with non-uniform locations. Non-

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uniform grid points are expressly or implicitly obtained via Shkedi's "(A) Registering" or "(C) Monitoring", and "(B) Recording" of non-uniform locations, and are used to improve efficient location determination.

132. Accordingly, Shkedi discloses each and every limitation of Claim 18.

B. Claim 18 Would Have Been Obvious Over Shkedi in View of Spain (Ground 2)

133. Per Section XIII.A.1, Claim 1 is disclosed by Shkedi.

134. Spain also discloses the subject matter of Claim 18.

135. To the extent Shkedi's disclosure is deemed not to expressly reference "non-uniform grid points", it would have been obvious to include such points in Shkedi's database to achieve the accuracy and reduction in computation Shkedi contemplates. Owner has defined "non-uniform grid points to encompass "interpolated" grid points. *See* EX1008, 23:1-15, EX1016, ¶61 ("grid points help[] fill in the map").

136. Spain discloses enhancing the accuracy of a fingerprint database (EX1009, ¶[0054]:1-3) by adding interpolated non-uniform grid points to a fingerprint matching database for location determination. Spain generates a "new grid" using a "complete grid of locations" as training data for a machine learning algorithm. EX1009, ¶¶[0054], [0055]. This "new grid" avoids any "need to obtain measurement for the complete grid" because grid points are generated. *Id.*, ¶[0055].

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“[T]he system can learn which are the ambiguous areas” to continually improve the database. *Id.*, ¶[0055]:17-18. Spain expressly states:

... the database is built by taking fingerprint measurements at predetermined locations and using intelligent algorithms that interpolate the fingerprints *at all locations in between the sampled locations*.

EX1009, [0101]:1-4 (emphasis added).

...learning/training techniques: (1) *they offer a way to interpolate between grid points [generating non-uniform grid points] and reconstruct the grid*.

EX1009, [0055]:6-9 (emphasis added).

“In one instance the fingerprint corresponds not to one exact spot on the surface of the earth, *but instead to a small area*. The Lat and Long fields in this embodiment indicate a *position inside the area*, preferably the center point.” EX1009, [0099]:9-13 (emphasis added). Spain’s interpolated points are “point[s] associated with representative calibration data for an area” that are non-uniform by reconstruction of the grid.

137. Shkedi and Spain seek to improve accuracy in mobile unit location determination using “fingerprinting” techniques. *See* EX1006, 8:48-56. Both Shkedi and Spain are directed to improving location accuracy in areas with degraded GPS capability. *See* EX1009, ¶[0034]; EX1006, 5:12-13.

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138. Spain's learning/training fingerprint techniques for interpolating non-uniform grid points is consistent with the disclosed objectives of enhanced location determination accuracy in Shkedi. Spain's addition of interpolated "grids of location data" would have been a routine addition to the grid point database of Shkedi. Enhancing Shkedi's database with interpolated non-uniform grid points would have been an obvious way to build the database in exactly the manner contemplated by Shkedi. Such a modification would have been routine, and according to known methods, to obtain predictable results with a high probability of success.

139. Accordingly, Shkedi and Spain in combination disclose each and every limitation of Claim 18 such that Claim 18 is rendered obvious.

C. Claims 1, 15, 18, 41 and 52 Are Anticipated By Zhu (Ground 3)

140. The following sections provide reference to where the elements of Claims 1, 15, 18, 41 and 52 are found in the prior art and an explanation why such claims are anticipated.

4. Preamble of Claim 1 is Disclosed in Zhu

141. The Preamble of Claim 1 recites "[a] method for determining a location of a mobile station, comprising."³ Zhu discloses the Preamble of Claim 1.

³ It is my understanding that Petitioner does not concede that the Preamble is limiting.

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142. Zhu’s “RSS technique estimates a cellular phone’s location by matching signal strengths measured at the handset with signal strengths recorded in a database of radio frequency (RF) maps.” EX1010, p.92, left col. *See also id.*, p.93, left col. (“the best match determines the xy-coordinates of the most likely handset location”), abstract.

143. Zhu’s “cellular phone” and “wireless handset” are mobile stations because the ’358 Patent indicates that “mobile stations” encompass wireless telephones. *Id.*, abstract; p.92, left col.; EX1001, 1:18-22.

144. To the extent the Challenged Claims encompass locating a mobile station at an indoor location (*see* Section VII.A.1), Zhu discloses indoor location determination. *See, e.g.*, EX1010, abstract (“locating *indoor* handsets”), p.92, left col. (“RSS location techniques[] for indoor users”), p.93, left col.

145. Accordingly, Zhu discloses the Preamble of Claim 1.

a. Element [1.1] is Disclosed in Zhu

146. Element [1.1] recites “providing a database of previously-gathered calibration data for a predetermined region in a wireless network.” Zhu discloses Element [1.1].

147. Zhu discloses providing “[a] database of RF coverage maps for all nearby serving sectors [that] was created from a combination of propagation

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modeling and varying levels of indoor and outdoor measurement calibration”. EX1010, p.92, right col. Zhu discloses that the map includes a grid wherein “[e]ach raster point in the grid corresponds to a location within the network and contains a vector of received signal strength indicator (RSSI) values in dBm for all audible base stations” and “[a] complete raster array of RSSI is called an RF Map Database (RFMD).” *Id.*, p.93, left col. *See also id.*, Fig. 3.

148. Zhu’s RF map database (RFMD) includes previously-gathered signal strength measurements which constitute “calibration data”. EX1010, p.93, left col. (“[o]nce an RFMD has been constructed for a network area, the RSSI-based location engine must compare received signal strength measurements made by the handset to the RFMD vectors.”).

149. Zhu’s RFMD calibration data includes “modified or unmodified network measurement data associated with a geographic location” (*see* Section VI.A.) and received from network base stations. EX1010, p.95, left col. (“each discrete (x,y) location in the RFMD”).

150. Zhu’s RFMD is for a “predetermined region in a wireless network”. EX1010, p.92, right col. (“[t]ests were performed on an 850 MHz IS 136 cellular network in mid-town Atlanta on the campus of the Georgia Institute of Technology”

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and “[t]he measurement area has length of 700m and width of 500m, as shown in Fig. 1.”).

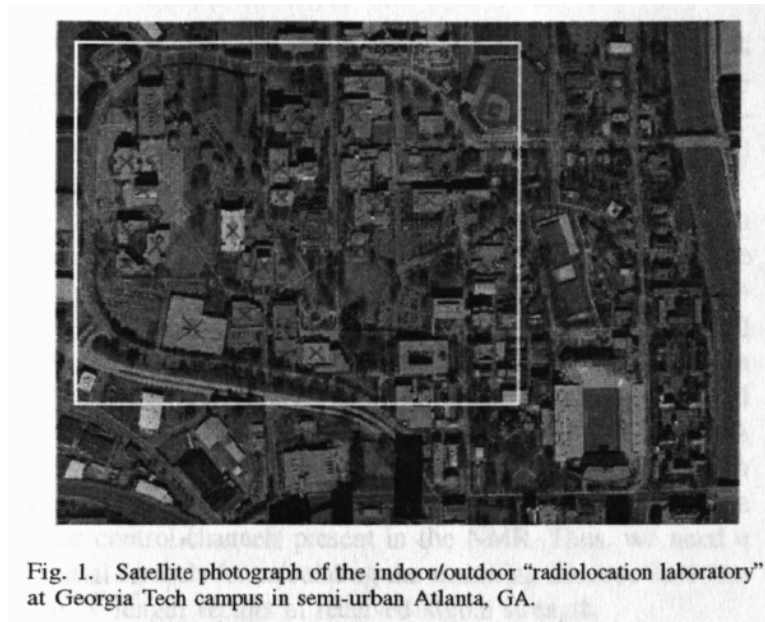


Fig. 1 of Zhu

151. Zhu’s network includes a first transmitter and a second transmitter. EX1010, p.92, right col. (“Three base stations were inside the measurement area”, “Another five base stations in the neighborhood also provided coverage”).

152. Accordingly, Zhu discloses each and every limitation of Element [1.1].

b. Element [1.2] is Disclosed in Zhu

153. Element [1.2] recites “collecting observed network measurement data.” Zhu discloses Element [1.2].

154. Zhu discloses “observed network measurement data”, including first and second signal characteristics (e.g., signal strengths) from first and second

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transmitters, is a mobile station NMR, from which the observed network measurement data can be collected for modifying (via normalization) into modified network measurement data of a modified NMR. *See* EX1001, 9:53-55 (“observed data would typically be the same or similar to the data in a network measurement report (NMR).”). The original NMR contains up to 26 signal characteristics (e.g., N+1, or 7 signal strength characteristics) that are used to determine the strongest 6 signal characteristics in a modified NMR. *See*, EX1010, p.95, left col. (“[e]ach physical xy location . . . contains up to 26 received signal strength values”).

155. The term “signal characteristic” encompasses signal strength measurements per the ’358 Patent. EX1001, 14:31-32, 14:35-37, 11:26-27.

156. Zhu therefore collects “measurement data from a network measurement report (*i.e.*, a report used in cellular networks which provides the results of a measurement from a mobile device on one or more cells)” (*see* Section VI.B.) because signal strength data measured by Zhu’s “cellular phone” is collected from the original NMR on Zhu’s cellular phone (e.g., an NMR of at least 7 signal strength characteristics).

157. Per the ’358 Patent’s “modified NMR” of adjusted power levels (EX1001, 5:14), Zhu collects observed network measurement data from the original NMR to produce the “modified NMR” of adjusted signal strengths to locate the

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cellular phone. EX1010, p.92, left col. and p.96, right col. *See* EX1001, 7:7-10. Zhu's modified NMR is transmitted from the mobile station to determine the phone's location. *See id.*, at 4: 41-45.

158. Zhu discloses that up to 26 signal strength values are associated with eight base stations (*e.g.*, a first transmitter and a second transmitter). EX1010, p.92, right col. The mobile station provides a vector of received signal strengths "for all audible base stations" for accessing the RFMD. *Id.*, p.92, right col., p.93, left col.

159. Zhu discloses software and circuitry for performing the collecting step. Zhu's "RSSI-based location engine" performs a "location algorithm". EX1010, p.93, left col. ("the RSSI-based location engine must compare received signal strength measurements made by the handset to the RFMD vectors.", "cellular network area is represented in a computer"), pp.94-95. Zhu's location algorithm is a computer program and mobile telephone devices include circuitry such as a processor for performing location determination functions. *See, e.g.*, EX1009, [0036]; EX1006, 11:12-17, 25:32-39, 14:8-40, 2:61-67.

160. Accordingly, Zhu discloses each and every limitation of Element [1.2].

c. Element [1.3] is Disclosed in Zhu

161. Element [1.3] recites "modifying said observed network measurement data." Zhu discloses Element [1.3].

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162. Zhu discloses using the N strongest signal strengths to modify the observed network measurement data of an NMR and produce a modified NMR.

163. Zhu discloses normalizing (“modifying”) observed network measurement data of an NMR vector using a strongest signal strength received. EX1010, p.95, left col., formula (8).

164. Zhu normalizes (“modifies”) signal strengths of the NMR vector using the “ N strongest channels”, and in so doing, modifies observed network measurement data using the greater magnitude signal characteristic. EX1010, p.95, left col. *See also id.*, p.94, right col. (“normalizing the RSS vector from NMR and RSS”).

165. Zhu uses an “averaged-NMR vector” as “[a] measured point [that] is actually the linear average of every instantaneous RF scanner measurement” to “remove any small-scale fading effects or other anomalies in the collection procedure.” EX1010, p.94, left col.

166. The averaged “NMR” data is the same as or similar to signal strength data reported in an NMR. *See, e.g.*, EX1001, 9:53-58 (the ’358 Patent discloses observed data need not be identical to NMR data and includes “similar” data).

167. Zhu modifies the NMR by subtracting the strongest signal strength from each control channel in the NMR using Formula (8). *Id.*, p.95, left col. Zhu

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“normalize[s] the averaged-NMR vector by subtracting out the average dBm-power of all received channels [*i.e.*, the strongest signals]” to generate the relative received signal strength of the handset measurement Phr_j :

$$Phr_j = Nrss_j - \frac{1}{N} \sum_{i=1}^N Nrss_i \quad (8)$$

Id. In Formula (8) of Zhu, the averaged-NMR vector (“ $Nrss_j$ ” in Formula (8), which corresponds to “observed network measurement data”) is modified using “the average dBm-power of all received channels” which is based on the greater magnitude signal characteristics (e.g., the N strongest signal strength values) among the “up to 26 received signal strength values.” *Id.*, p.95, left col. The use of relative/normalized measurements corresponds to an example disclosed in the ’358 Patent. *See, e.g.*, EX1001, 6:1-4. *See also* EX1005, pp.25-26; EX1001, 1:6-14. Zhu modifies the “observed network measurement data” using the “greater magnitude signal characteristic.”

168. Zhu uses software and circuitry for performing the modifying, and an “RSSI-based location engine” performs a “location algorithm”. EX1010, p.93, left col., pp.94-95. Zhu’s location algorithm is a computer program and mobile telephone devices include circuitry such as a processor for performing location

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determination functions. *See, e.g.*, EX1009, [0036]; EX1006, 11:12-17, 25:32-39, 14:8-40, 2:61-67.

169. Accordingly, Zhu discloses each and every limitation of Element [1.3].

d. Element [1.4] is Disclosed in Zhu

170. Element [1.4] recites “comparing said modified network measurement data with said database of calibration data by positioning determining equipment to thereby determine the location of the mobile station.” Zhu discloses Element [1.4].

171. Zhu discloses “estimat[ing] a cellular phone’s location by matching signal strengths measured at the handset with signal strengths recorded in a database of radio frequency (RF) maps.” EX1010, p.92, left col.

172. Zhu “compare[s] received signal strength measurements made by the handset to the RFMD vectors” and “[t]he best match determines the xy-coordinates of the most likely handset location.” *Id.*, p.93, left col. Zhu compares modified network measurement data (normalized “signal strengths measured at the handset”) with said database of calibration data in the RFMD to determine a mobile station “handset location”.

173. Zhu discloses “[c]alculat[ing] the Euclidean distance, $M(x, y)$, between these normalized NMR vector and database signal strengths” (EX1010, p.93) to

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determine the lowest weighted Euclidean distance”. *Id.*, pp.94-95. *See also id.*, p.95, right col.

174. Zhu’s normalized network measurement data is “modified network measurement data” and Zhu’s RF Map Database (RFMD) is a “database of calibration data”. *See* Sections VII.C.1.a.-d.

175. Zhu discloses comparing said normalized network measurement data with the RF Map Database (RFMD) to thereby determine the location of the mobile station.

176. Zhu discloses that the comparison of data is performed “by positioning determining equipment”, given that Zhu discloses use of a “RSSI-based location engine” that carries out steps of a “location algorithm”. EX1010, p.93, left col. (“the RSSI-based location engine must compare received signal strength measurements made by the handset to the RFMD vectors.”), pp.94-95.

177. Zhu’s location algorithm is implemented using a computer program and it is well known to provide mobile telephone devices with circuitry such as a processor for performing location determination functions. *See, e.g.*, EX1009, [0036]; EX1006, 11:12-17, 25:32-39, 14:8-40, 2:61-67.

178. Thus, Zhu’s “RSSI-based location engine” and “location algorithm” (including data comparison) are implemented using circuitry such as a processor.

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Owner asserts that its list of purported algorithms is non-limiting. EX1025, p.12. Zhu discloses the purported algorithm of Fig. 2, step 202 (“Comparing the Network Measur[e]ment Data to a Calibration Database”) and step 203 (“Estimating the Location of the Mobile Station Based on the Comparison”) as well as Fig. 7, step 707 (“Comparing the Modified Network Measurement Data to the Database of Calibration Data to Locate the Mobile”) of the ’358 Patent.

179. Zhu also discloses equipment for determining mobile station location. Thus, Zhu discloses “by positioning determining equipment” under any of the constructions proposed in Related Litigation for the reasons discussed herein concerning Elements [1.1] to [1.3].

180. Accordingly, Zhu discloses each and every limitation of Element [1.4].

5. Preamble of Claim 15 is Disclosed in Zhu

181. The Preamble of Claim 15 recites “[a] system for determining a location of a mobile station, comprising.”⁴ Zhu discloses the Preamble of Claim 15 for at least the reasons discussed with respect to the Preamble of Claim 1. *See* Claim 1, Section XIII.C.1.

⁴ It is my understanding that Petitioner does not concede that the Preamble is limiting.

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182. Accordingly, Zhu discloses the Preamble of Claim 15.

a. Element [15.1] is Disclosed in Zhu

183. Element [15.1] recites “a database of previously-gathered calibration data for a predetermined region in a wireless network.” Zhu discloses Element [15.1] for at least the reasons discussed with respect to Element [1.1]. *See* Element [1.1], Section XIII.C.1.a.

184. Accordingly, Zhu discloses each and every limitation of Element [15.1].

b. Element [15.2] is Disclosed in Zhu

185. Element [15.2] recites “circuitry for collecting observed network measurement data.” Zhu discloses Element [15.2] for at least the reasons discussed with respect to Element [1.2]. *See* Element [1.2], Section XIII.C.1.b.

186. Accordingly, Zhu discloses each and every limitation of Element [15.2].

c. Element [15.3] is Disclosed in Zhu

187. Element [15.3] recites “circuitry for modifying said observed network measurement data.” Zhu discloses Element [15.3] for at least the reasons discussed with respect to Element [1.3]. *See* Element [1.3], Section XIII.C.1.c.

188. Accordingly, Zhu discloses each and every limitation of Element [15.3].

d. Element [15.4] is Disclosed in Zhu

189. Element [15.4] recites “circuitry for comparing said modified network measurement data with said database of calibration data to thereby determine the location of the mobile station.” Zhu discloses Element [15.4] for at least the reasons discussed with respect to Element [1.4]. *See* Element [1.4], Section XIII.C.1.d.

190. Accordingly, Zhu discloses each and every limitation of Element [15.4].

6. Claim 18 is Disclosed in Zhu

191. Per Section XIII.C.1., Claim 1 is disclosed by Zhu.

192. Claim 18 recites “[t]he system of claim 15 wherein said database comprises previously-gathered calibration data for one or more non-uniform grid points within said region.” Zhu discloses the subject matter of Claim 18.

193. Zhu discloses that the RF map database includes measured points at non-uniform locations in a region:

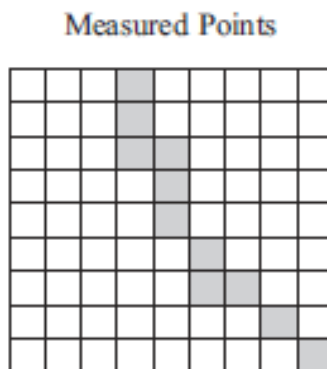


Fig. 2 of Zhu (Excerpt)

EX1010, Fig. 2, pp.93-94. Shown in Fig. 2, Zhu's measured points (in gray) "tend to cluster along paths due to the walking or driving methods of collection" and are non-uniformly spaced throughout a region. *Id.*, p.94, left col. Zhu's "clusters or paths" of measured points are stored in the RF map database and constitute the claimed "one or more non-uniform grid points". *See* Section VII.A.3; *see also id.*, 2:43-50.

194. Owner has defined "non-uniform grid points" to encompass "interpolated" grid points. *See* EX1008, 23:1-15, EX1016, ¶61 ("grid points help[] fill in the map"). Zhu discloses "interpolation" based on the measured non-uniform points (*see id.*, pp.93-94) through "a 2D cubic interpolation scheme over a diamond-shaped area that surrounds every measured raster point" thereby generating additional non-uniform grid points. *Id.*, p.93, right col. Zhu's interpolated non-uniform grid points are added to the RF map database for each measured point.

195. Zhu also discloses modeled points are determined for a location, including unmeasured locations, to expand the RF map database with non-uniform grid points. "[E]ach RF map contains scanner measurements which gracefully blend into modeled, unmeasured regions." *Id.*, p.93, right col.

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196. Zhu determines non-uniform grid points to build out the RF map database using both interpolated and modeled points.

197. Zhu's database of non-uniform grid points constitutes "point[s] associated with representative calibration data for an area." Each "grid spacing" of Zhu's RF map database is a 10-meter square area. EX1010, p.93, left col. A non-uniform grid point within each 10-meter area is associated with representative calibration data (*e.g.*, measured points). EX1010, p.94, left col. Zhu's stored non-uniform grid points are used for determining an unknown location of a mobile device.

198. Accordingly, Zhu discloses each and every limitation of Claim 18.

7. Preamble of Claim 41 is Disclosed in Zhu

199. The Preamble of Claim 41 recites "[a] method for determining a location of a mobile station, comprising."⁵ Zhu discloses the Preamble of Claim 41 for at least the reasons discussed with respect to the Preamble of Claim 1. *See* Claim 1 Preamble, Section XIII.C.1.

200. Accordingly, Zhu discloses the Preamble of Claim 41.

⁵ It is my understanding that Petitioner does not concede that the Preamble is limiting.

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a. Element [41.1] is Disclosed in Zhu

201. Element [41.1] recites “providing a database of previously-gathered calibration data for a predetermined region in a wireless network.” Zhu discloses Element [41.1] for at least the reasons discussed with respect to Element [1.1]. *See* Claim 1, Section XIII.C.1.a.

202. Accordingly, Zhu discloses each and every limitation of Element [41.1].

b. Element [41.2] is Disclosed in Zhu

203. Element [41.2] recites “collecting observed network measurement data from each of a plurality of transmitters including a signal characteristic from each one of said plural transmitters.” Zhu discloses Element [41.2] for at least the reasons discussed with respect to Element [1.2]. *See* Claim 1, Section XIII.C.1.b.

204. Accordingly, Zhu discloses each and every limitation of Element [41.2].

c. Element [41.3] is Disclosed in Zhu

205. Element [41.3] recites “determining an average value for select ones of said signal characteristics.” Zhu discloses Element [41.3].

206. Zhu discloses determining the “average dBm-power of all received channels” which satisfies the claimed “average value for select ones of said signal characteristics”. EX1010, p.95, left col.

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207. Zhu discloses “[n]ormaliz[ing] the averaged-NMR vector by subtracting out the average dBm-power of all received channels to generate the relative received signal strength of the handset measurement”. *Id.*

208. The signal strength (“power”) values used to calculate Zhu’s average dBm-power are taken from the observed network measurement data (Zhu’s “NMR”). *Id.*, p.95, left col. (average dBm-power in formula (8) is based on N_{rss_i} which is a signal strength of the NMR, see formula (5)).

209. Zhu discloses that its technique utilizes eight transmitters (“base stations”). EX1010, p.92, right col. (“Three base stations were inside the measurement area”, “Another five base stations...also provided coverage at the edge of the test area”). The signal strengths used to calculate Zhu’s average dBm-power are collected from a plurality of transmitters (“base stations”) because Zhu discloses that the signals strengths are “of all received channels”.

210. Zhu discloses determining the location of the mobile station in an area serviced by a plurality of transmitters (“base stations”) and the NMR contains signal strength values associated with a plurality of transmitters, given that Zhu utilizes eight transmitters (“base stations”) and contemplates NMRs having “N values” corresponding to any subset of the “up to 26 received signal strength values” in the RF database. EX1010, p.95, left col. *See also id.*, p.95, left col. (“location algorithm

selects a subset of N values that corresponds to the same control channels present in the NMR”).

211. The '358 Patent discloses that “[t]he average received signal power level may be calculated a number of different ways” including by taking “the average of all (N) signal powers” (EX1001, 7:2-7), like Zhu (“average dBm-power of all received channels”).

212. Accordingly, Zhu discloses each and every limitation of Element [41.3].

d. Element [41.4] is Disclosed in Zhu

213. Element [41.4] recites “modifying said observed network measurement data using said average value.” Zhu discloses Element [41.4] for at least the reasons discussed with respect to Element [1.3]. *See* Claim 1, Section XIII.C.1.c.

214. Zhu discloses modifying the NMR using the average value (*i.e.*, Zhu’s “average dBm-power of all received channels”) at least because Zhu discloses normalizing the NMR using the average dBm-power of all received channels. EX1010, p.94, right col. (“normalizing the RSS vector from NMR and RSS”), p.95, left col. (“Normalize the averaged-NMR vector by subtracting out the average dBm-power of all received channels to generate the relative received signal strength of the handset measurement”), formula (8).

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215. Zhu first receives a sequence of NMRs (e.g., 10 NMRs) and averages the sequence of NMRs to determine a linearly averaged NMR in the form of: Nr_{ss_j} = $[Nr_{ss_1}, Nr_{ss_2} \dots Nr_{ss_N}]$ where Nr_{ss_j} is a vector of averaged signal strength measurements over each control channel such that the sequence of NMRs is averaged to provide a linearly averaged NMR representing “observed network measurement data.” Each NMR in the sequence of NMRs may also serve as “observed network measurement data.”

216. The linear averaging is performed by Zhu to improve accuracy of measurements and to “effectively remove any small-scale fading effects or other anomalies in the collection procedure.” *Id.*, p.94, §III.B, ¶6. The linearly averaged NMR represents an average of the sequence of NMRs (e.g., a time averaged sequence) which “is very effective in improving the location error statistics.” *Id.*, p.96, §IV.A, ¶1.

217. Following linear averaging to obtain more accurate “observed network measurement data,” Zhu modifies the NMR by subtracting the average signal strength from the linearly averaged signal strength of each control channel in equation (8). *Id.*, p.95, §III.D, ¶4.

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218. That is, Zhu “normalize[s] the averaged-NMR vector by subtracting out the average dBm-power of all received channels to generate” the relative received signal strength of the handset measurement Phr_j :

$$Phr_j = Nrss_j - \frac{1}{N} \sum_{i=1}^N Nrss_i \quad (8)$$

Id. This normalization satisfies the claimed modification.

219. In equation (8) of Zhu, the “observed network measurement data” is modified by the averaging term of $Nrss_i$, which is an average of “all received channels” which were determined as greater magnitude signal characteristics than the other “26 received signal strength values.” *Id.*, p.95, §III.D., ¶2-4.

220. Thus, Zhu modifies the “observed network measurement data” using an average of signal strengths which uses the “greater magnitude signal characteristic.”

221. Per Section XIII.A.1.c., the use of relative/normalized measurements corresponds to an example disclosed in the ’358 Patent. *See, e.g.*, EX1001, 6:1-4. *See also* EX1005, pp.25-26; EX1001, 1:13-16. Per Section XIII.A.1.c., normalization constitutes a modification as stated in the ’694 Reexamination. EX1003, p.89.

222. Accordingly, Zhu discloses each and every limitation of Element [41.4].

e. Element [41.5] is Disclosed in Zhu

223. Element [41.5] recites “comparing said modified network measurement data with said database of calibration data by positioning determining equipment to thereby determine the location of the mobile station.” Zhu discloses Element [41.5] for at least the reasons discussed with respect to Element [1.4]. *See* Claim 1, Section XIII.C.1.d.

224. Zhu discloses modifying the observed network measurement data using said average value, as explained above. *Id.* Such modification results in modified network measurement data, and this modified network data would be compared with the database of calibration data as explained above. *Id.*

225. Accordingly, Zhu discloses each and every limitation of Element [41.5].

226. Thus, Zhu discloses each and every limitation of Claim 41.

8. Claim 52 is Disclosed in Zhu

227. Claim 52 depends from claim 41. Per Section XIII.C.4., Claim 41 is disclosed by Zhu.

228. Claim 52 recites “[t]he method of claim 41 wherein at least one of said plurality of transmitters is not a member of said wireless network.” Zhu discloses the subject matter of Claim 52.

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229. Zhu discloses that the handset collects “signal strengths from N control channels” associated with eight base stations (transmitters), three of which “were inside the measurement area” and “[a]nother five base stations in the neighborhood provided coverage at the edge of the test area”, i.e., outside the measurement area. EX1010, p.92, right col. and p.95, left col. The five base stations of Zhu are each “not a member of said wireless network” at least because they are outside of the measurement area. EX1010, Fig. 1, p.92, right col.

230. This understanding is consistent with Claim 40 of the ’358 Patent which specifies that a “neighboring transmitter” can constitute the transmitter that “is not a member of said wireless network”. EX1001, 14:66-67.

231. This is also consistent with Fig. 6 of the Related ’784 Patent depicting base stations (transmitters) 21, 22, 23 which are not members of the same wireless network:

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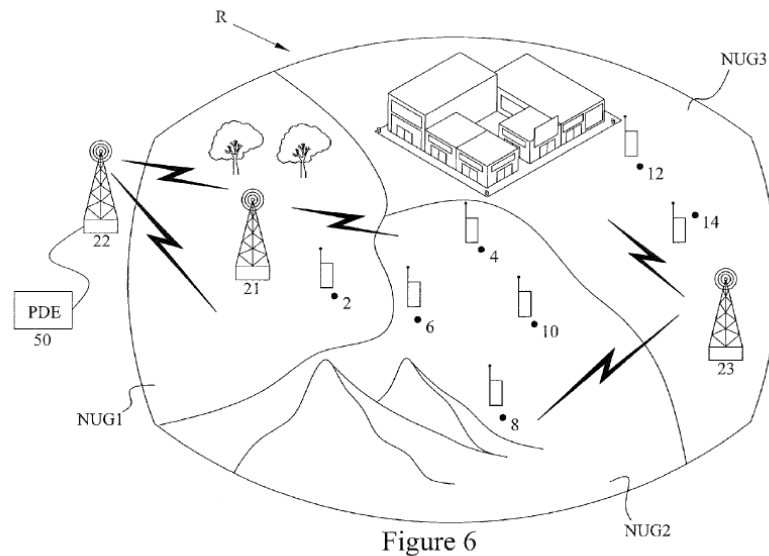


Fig. 6 of the '784 Patent

EX1007, 6:30-21 (“BS 22 may serve one or more NUGs and may be located outside the region (R)”).⁶

232. Accordingly, Zhu discloses each and every limitation of Claim 52.

⁶ It is my understanding that, in Related Litigation, Owner construed the '358 Patent in light of Fig. 6 of US Patent No. 9,097,784 (EX1007) which belongs to the same family as the '358 Patent. *See, e.g.*, EX1024, p.14-15. Indeed, the '358 Patent contains references to elements of Fig. 6 which do not appear in the figures of the '358 Patent. *See, e.g.*, EX1001, 3:59-63.

**D. Claim 18 Would Have Been Obvious Over Zhu in View of Spain
(Ground 4)**

233. The following sections provide reference to where the elements of Claim 18 are found in the prior art.

234. Claim 18 depends from claim 15. Per Section XIII.C.2., Claim 15 is disclosed by Zhu.

235. Claim 18 recites “[t]he system of claim 15 wherein said database comprises previously-gathered calibration data for one or more non-uniform grid points within said region.” Zhu and Spain in combination disclose the subject matter of Claim 18.

236. Zhu discloses measured points that are non-uniform and grid points derived therefrom that are similarly non-uniform (*i.e.*, interpolated/modeled). Owner has acknowledged that interpolated points constitute non-uniform grid points in a radio frequency map. *See* EX1008, 23:1-15, EX1016, ¶61. In light of Owner’s admission, Zhu’s interpolated points clearly constitute non-uniform grid points.

237. Zhu’s interpolation is referenced as “a 2D cubic interpolation scheme over a diamond-shaped area that surrounds every measured raster point.” EX1010, p.93, right col. Spain teaches that interpolation techniques such as Zhu’s are well known in the art. Spain teaches interpolation to determine non-uniform grid points (*e.g.*, locations where GPS is unavailable, EX1009, ¶[0034]). Zhu contemplates

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using interpolation techniques such as that of Spain to produce non-uniform grid points.

238. Zhu discloses that the RF map database includes “clusters or paths of measured points,” “interpolated points” and “modeled points.” EX1010, pp.93-94. Spain provides a known method to generate interpolated points. Spain teaches a learning/training technique for generating interpolated points for improving location accuracy when using RF fingerprint databases like the one disclosed by Zhu. Spain teaches that “[t]o improve the accuracy of the fingerprint database, learning/training techniques and methodologies can be adopted for this problem.” EX1009, ¶[0054]:1-3. *See also id.*, ¶[0054]:4-7, ¶[0055]:5, ¶[0055]:5-18, [0101]:1-4, [0054]:1-3, [0055]:1-6, [0055]:6-9.

239. Per Section XIII.B., Spain expressly states:

... the database is built by taking fingerprint measurements at predetermined locations and using intelligent algorithms that interpolate the fingerprints *at all locations in between the sampled locations*.

EX1009, [0101]:1-4 (emphasis added).

...learning/training techniques: (1) *they offer a way to interpolate between grid points [generating non-uniform grid points] and reconstruct the grid*.

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EX1009, [0055]:6-9 (emphasis added). Spain discloses generating interpolated points for “all locations in between the sampled locations” to “reconstruct the grid” while Zhu’s interpolation references a “diamond-shaped area.”

240. A POSITA would have been motivated to modify Zhu’s system to include Spain’s learning/interpolating technique to improve location accuracy of Zhu’s fingerprint techniques by generating non-uniform grid points for “all locations in between the sampled locations.” A POSITA would have had a reasonable expectation of success given that both Zhu and Spain seek to improve location accuracy in mobile unit “fingerprinting” techniques using signal strengths measured by the mobile unit. *See* EX1010, pp.92-93; *see* EX1009, ¶[0035]:1-7, ¶[0003]:2-3, ¶[0009], title and abstract. Thus, a POSITA would have recognized that Spain’s learning/training techniques for interpolating and regenerating a grid to generate “new grids” would have improved the accuracy of Zhu’s location determination.

241. Accordingly, Zhu and Spain in combination disclose each and every limitation of Claim 18 such that Claim 18 is rendered obvious.

E. Claim 52 Would Have Been Obvious Over Zhu in View of Laitinen (Ground 5)

242. Zhu discloses the subject matter of claim 52 (*see* Section VII.C.5.).

243. To the extent that “not a member of said wireless network” encompasses a transmitter belonging to other “cellular communication protocols” in

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view of disclosures of the '358 Patent (*see, e.g.*, EX1001, 11:62-67), Zhu discloses the subject matter of claim 52 under such an interpretation. Zhu teaches that its techniques are compatible with “other cellular telephony air interface (such as GSM, CDMA, WCDMA, etc.)”. EX1010, p.96, §IV.B., ¶3. Indeed, it was well known to collect location data from multiple wireless networks in fingerprinting techniques to improve accuracy:

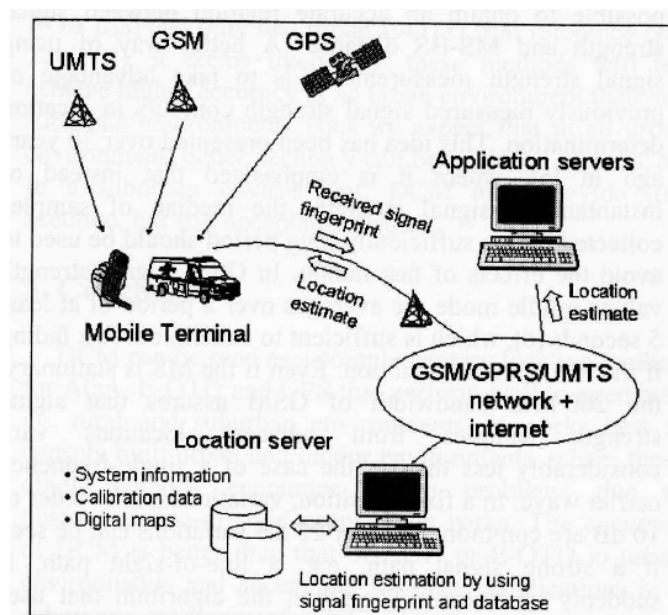


Figure 1. Architecture of DCM system.

Fig. 1 of Laitinen

EX1011 Fig. 1, 2505 (“This fingerprint may consist of signals measured from GSM, UMTS, WLAN, or GPS systems also”). *See also* EX1006, 22:65-23:2 (“a wireless phone can choose between several networks to connect to.... [T]he wireless phone can measure the signal strengths of several surrounding networks.”); 23:13-15 (“the

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combined measurements of surrounding [] networks and cells will possibly provide a more accurate location representation.”), 23:13-20. Thus, it would have been obvious to use data collected from multiple wireless networks to improve accuracy of location determination given that Zhu expressly teaches that its technique is applicable to “other cellular telephony” protocols, and doing so would have resulted in collecting data from a transmitter that is “not a member” of the wireless network.

244. It is my understanding that Owner, in Related Litigation, asserts that “not a member of the same wireless network” encompasses a Wi-Fi transmitter in relation to “cell towers” in a cellular network. EX1027, Appendix B, p.28. The ’358 Patent does not disclose the term “Wi-Fi”. Nonetheless, it was well known to “combine[] measurements of signal strengths (or other parameters made available by networks) from several different networks including cellular networks, WiFi networks and WiMax networks.” EX1006, 23:28-31; 22:63-23:31. Thus, it would have been obvious to use a Wi-Fi transmitter with Zhu’s cellular network for at least the reasons discussed above concerning use of different protocols.

245. Thus, claim 52 would have been obvious over Zhu in view of Laitinen.

F. Claims 41 and 52 Would Have Been Obvious Over Shkedi in View of Zhu (Ground 6)

246. The following section provides reference to where the elements of Claims 25, 26, and 35 are found in the prior art.

1. Preamble of Claim 41 is Disclosed in Shkedi

247. The Preamble of Claim 41 recites “[a] method for determining a location of a mobile station, comprising.”⁷ Shkedi discloses the Preamble of Claim 41 for at least the reasons discussed with respect to the Preamble of Claim 1. *See* Claim 1 Preamble, Section XIII.A.1.

248. Accordingly, Shkedi discloses the Preamble of Claim 41.

a. Element [41.1] is Disclosed in Shkedi

249. Element [41.1] recites “providing a database of previously-gathered calibration data for a predetermined region in a wireless network.” Shkedi discloses Element [41.1] for at least the reasons discussed with respect to Element [1.1]. *See* Claim 1, Section XIII.A.1.a.

250. Accordingly, Shkedi discloses each and every limitation of Element [41.1].

b. Element [41.2] is Disclosed in Shkedi

251. Element [41.2] recites “collecting observed network measurement data from each of a plurality of transmitters including a signal characteristic from each

⁷ It is my understanding that Petitioner does not concede that the Preamble is limiting.

one of said plural transmitters.” Shkedi discloses Element [41.2] for at least the reasons discussed with respect to Element [1.2]. *See* Claim 1, Section XIII.A.1.b.

252. Accordingly, Shkedi discloses each and every limitation of Element [41.2].

c. Element [41.3] is Disclosed in Shkedi and Zhu

253. Element [41.3] recites “determining an average value for select ones of said signal characteristics.” Shkedi and Zhu in combination disclose Element [41.3].

254. Shkedi acknowledges that numerous normalization techniques are used for determining the location of a mobile phone. EX1006, 24:55-61 (“determinations that are based on derivatives, integrals, statistical metrics, *mathematical normalizations*, correlation functions, heuristic convolution functions, or the likes—are substantially consistent” with Shkedi’s disclosure) (emphasis added).

255. Shkedi expressly teaches normalizing signal strengths using “a strongest signal” (*id.*, 6:28-29), “dividing ... by the strongest signal” (*id.*, 21:4) and “divid[ing] ... by the sum of the signals of the 2 strongest cells”. *Id.*, 21:52-53. *See also id.*, 21:1-61.

256. Shkedi teaches using normalization because “it is the relative signal strengths that form an important metric for comparative purposes.” *Id.*, 6:21-23.

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257. Shkedi discloses using “mathematical normalizations”, such as an average value, for select ones of said signal characteristics (*e.g.*, signal strengths).

258. Zhu discloses determining an average value for select ones of said signal characteristics (*e.g.*, signal strengths) for normalizing signal strengths to determine the location of a mobile phone. *See* Section VII.C.4.c., Element [41.3], *supra*.

259. A POSITA would have been motivated to apply Zhu’s teachings for determining an average value of signal characteristics to Shkedi’s normalization for mobile phone location determination. Such “mathematical normalization” using an average value is contemplated by Shkedi and would “form an important metric” for comparing signal strengths.

260. Determining an average value for normalization in Shkedi would have constituted a simple substitution of one known element for another to obtain predictable results. A POSITA would have been motivated to substitute “dividing ... by the strongest signal” or “divid[ing] ... by the sum of the signals of the 2 strongest cells” with normalizing (*e.g.*, dividing) by an average value of signal strengths. Such a modification would have been the use of known techniques (Zhu’s determination of an average value and normalization therewith) to improve a similar method of mobile phone location determination in the same way to yield predictable

results. Such a modification would have been routine, and according to known methods, to obtain predictable results of signal strength normalization with a high probability of success.

261. Accordingly, Shkedi and Zhu in combination disclose each and every limitation of Element [41.3].

d. Element [41.4] is Disclosed in Shkedi and Zhu

262. Element [41.4] recites “modifying said observed network measurement data using said average value.” Shkedi and Zhu in combination disclose Element [41.4] for at least the reasons discussed with respect to Element [1.3] and Element [41.3]. *See* Claim 1, Section XIII.A.1.c.

263. Shkedi discloses modifying said observed network measurement data. *See* Section XIII.A.1.c, Element [1.3]. Shkedi and Zhu in combination teach determining an average value for mobile phone location determination. *See* Section XIII.E.1.c., Element [41.3].

264. A POSITA would have been motivated to use the average value taught by Zhu and as applied to Shkedi (*see* Section VII.E.1.c.) to modify (*e.g.*, normalize) signal strengths for mobile phone location determination.

265. Accordingly, Shkedi and Zhu in combination disclose each and every limitation of Element [41.4].

e. Element [41.5] is Disclosed in Shkedi

266. Element [41.5] recites “comparing said modified network measurement data with said database of calibration data by positioning determining equipment to thereby determine the location of the mobile station.” Shkedi discloses Element [41.5] for at least the reasons discussed with respect to Element [1.4]. *See* Claim 1, Section XIII.A.1.d.

267. Accordingly, Shkedi discloses each and every limitation of Element [41.5].

268. Thus, Shkedi and Zhu in combination disclose each and every limitation of Claim 41 such that Claim 41 is rendered obvious.

2. Claim 52 is Disclosed in Shkedi

269. Claim 52 depends from Claim 41. Per Section XIII.F.1., Claim 41 is disclosed by Shkedi and Zhu in combination.

270. Claim 52 recites “[t]he method of claim 41 wherein at least one of said plurality of transmitters is not a member of said wireless network.” Shkedi discloses the subject matter of Claim 52.

271. Shkedi discloses that a mobile phone can receive signals from transmitters that are members of different wireless networks. EX1006, 22:65-23:2 (“a wireless phone can choose between several networks to connect to, which means that the wireless phone can measure the signal strengths of several surrounding

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networks (or other parameters made available by the networks to the wireless phone).”

272. Shkedi discloses that a mobile station connects to a first wireless network (*i.e.*, “said wireless network”) to receive signals, while the mobile station can “choose between several networks to connect to.” EX1006, 65-66. Shkedi’s mobile station receives signals from transmitters that are members of “said wireless network,” and the mobile station can receive signals from transmitters in “surrounding networks” that are not members of “said wireless network.” *See* EX1006, 22:63-23:31. *See also id.*, 18:13-17, 23:23-31.

273. To the extent observed network measurement data is deemed collected from Wi-Fi hotspots and cell towers (*i.e.*, transmitters) where such Wi-Fi hotspots are not members of the same wireless network as the cell towers (EX1027, p.28), Petitioner acknowledges that the ’358 Patent does not disclose any examples of a Wi-Fi hotspot or Wi-Fi transmitter and the ’358 Patent does not disclose the term “Wi-Fi” or “Wi-Fi hotspot” anywhere in the specification or claims. Shkedi discloses a specific example where “a phone can measure not only the signal strengths of the surrounding cells but also the signal strengths of surrounding WiFi networks”. EX1006, 23:11-13; *see* 23:3-31.

274. Accordingly, Shkedi discloses the subject matter of Claim 52.

XIV. SECONDARY CONSIDERATIONS

275. As discussed herein, all elements of the Challenged Claims were known in the art, and any differences would have been obvious to a POSITA based on the disclosures of the applied references and the knowledge in the art.

276. I am not aware of any secondary considerations that would alter my opinion. For instance, there was no long felt need as multiple different databases and calibration data used for determining locations of wireless device were known and used before the effective filing date of the '358 Patent.

277. As another example, the '358 Patent and its techniques are not widely used in the art or incorporated into any commercially successful location determination systems. I am not aware of a location determination system that is commercially successful marked with the '358 Patent.

278. Any secondary considerations evidence Owner may offer in this proceeding would be insufficient to overcome the strong evidence that the Challenged Claims are obvious.

XV. CONCLUSION

279. For the reasons set forth above, it is my opinion that all elements of the Challenged Claims of the '358 Patent are disclosed or suggested by the prior art. In my opinion, the Challenged Claims of the '358 Patent would have been obvious over the prior art.

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280. In signing this Declaration, I understand that the Declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

281. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Date: August 10, 2023



David H. Williams

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APPENDIX 1

I have previously testified and/or been consulted as an expert in the
following matters:

Clients	Filing Date	Court Case Information (if applicable)
BJs Wholesale	April 2023 (Institution Scheduling Order)	BJ'S WHOLESALE CLUB HOLDINGS, INC. v. WALMART APOLLO, LLC; PTAB; IPR2022-01496, Patent 10,368,187 B1; IPR2022-01509, Patent 10,368,188 B2; Deposition
OHD (Overhead Door)	August 2020	ITC, Overhead Door Corporation and GMI Holdings Inc. v. The Chamberlin Group (CGI), In the Matter of CERTAIN MOVABLE BARRIER OPERATOR SYSTEMS AND COMPONENTS THEREOF, Investigation No. 337-TA-1209 – Deposition on Enforcement Proceeding
UTTO	March 25,2022	UTTO INC., Plaintiff, v. METROTECH CORPORATION, Defendant. Court: United States District Court, Northern District of California 22-cv-01904-WHO (N.D. Cal. Dec. 19, 2022); Deposition
Pacific Controls Inc.	12/12/2019 (Decision defining final scope)	PACIFIC CONTROLS, INC. v. CUMMINS INC., UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF NEW YORK; CASE NO. 19-cv-3428

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		(MKV) (BCM); Deposition, Testimony
State of New York	2021	State of NY vs. Kenneth Cramer; Case: 44-1-2022-0174; Mental Hygiene Legal Service, Appellate Division, Third Judicial Dept.; Testimony
HP, Aruba	May 25, 2021	BILLJCO, LLC,. Plaintiff, vs. Case No. 2:21-cv-0018e-JRG HEWLETT PACKARD ENTERPRISE COMPANY, ARUBA NETWORKS, LLC; Eastern District Court of Texas (EDTX); Depositions (2);
Lyft	November 30, 2020	Lyft, Inc. vs. Rideshare Displays; PTAB; IPR2021-01598, -01599, -01600, -01601, -01602; Deposition
Google, VIVINT, Ecobee	4/28/2021	ECOFACITOR, INC. v. GOOGLE LLC (Nest), Civil Action No. 6:20-cv-00075 (ADA) ECOFACITOR, INC. v. ECOBEE, INC., Case No. 6:20-cv-00078-ADA ECOFACITOR, INC. v. VIVINT, INC., Case No. 6:20-cv-00080-ADA; Western District of Texas (WDTX); Deposition and Testimony – (Google case, being appealed); Ecobee and VIVINT trial pending
GMG (Green Mountain Grill)	11/24/2020	ITC, Traeger v. GMG, In matter of CERTAIN CLOUD-CONNECTED WOOD-PELLET GRILLS AND COMPONENTS THEREOF, Investigation No. 337-TA-1237 – Deposition, Testimony;
OHD (Overhead Door)	August 2020	ITC, Overhead Door Corporation and GMI Holdings Inc. v. The Chamberlin Group (CGI), In the

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		Matter of CERTAIN MOVABLE BARRIER OPERATOR SYSTEMS AND COMPONENTS THEREOF, Investigation No. 337-TA-1209 – Report, Deposition and Testimony on 2 patents;
Draft Kings	6/17/2020	DRAFTKINGS INC. v. INTERACTIVE GAMES LLC (PTAB), IPR2020-01107 - Depositions (2)
Target	5/15/2020	TARGET CORPORATION V. PROXICOM WIRELESS, LLC; Case 2020-00903 (PTAB); Depositions (7)
Heil	September 5, 2017	SONRAI SYSTEMS, LLC V. ROMANO ET.AL, NORTHERN DISTRICT OF ILLINOIS (EASTERN DIVISION) – DEPOSITION; IN PROGRESS
Zillow	July 2, 2019	Corus Realty Holdings, Inc. v. Zillow Group Inc., et al., Case No.21:18-cv-00847-JLR (WD. Wash) – Deposition;
Lyft	July 23, 2018	RideApp, In. v. Lyft, Inc., Case No 3:18-cv-07152-JST (U.S. District Court for the Northern District of California) – Deposition;
FedEx	Case filed August 31, 2016	Intellectual Ventures II v. Fed Ex, Eastern District Court of Texas), Civil Action No. 2:16-cv-00980-JRG. Deposition and Testimony;
Google	Declarations filed May 15, 2018	AGIS v. Google, Cases Nos. IPR 2018-01079, -01080 (PTAB), Depositions (2)

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Samsung	2018	IPR2018-01554 for SAMSUNG ELECTRONICS CO., LTD. v. IRON OAK TECHNOLOGIES, LLC., Patent No. 5,966,658. (Declaration, no Deposition)
A&V Oil and Gas	Internal Audit Report – 2017 August 17	A&V Oil and Gas Limited v Petrotrin Arbitration, dispute triggered by Internal Audit report by Petroleum Company of Trinidad and Tobago, Limited. – Testimony;
Gounaris Abboud Co., LPA	Indictment April 14, 2017	State of Ohio, Montgomery County v. Brandon Howard. The Court of Common Pleas. Case 2017 CR 00769/1 Docket ID: 3077144, (Video) Testimony in Daubert Hearing regarding validity of Google Timeline as forensic/location data collection tool.
John Hamilton (compensation via State of Tennessee)	Incident, December 26, 2016	State of Tennessee v. Xavier Martin (associated with State. v. Marlando Shuntell Sturghill, Docket 17-237), Testimony at trial;
Google	Declarations submitted June 24, 2015	Google Inc. (Nest), et al. v. e.Digital Corp., Case Nos. IPR2015-01470, -01471, -01472, -01473, -1474, -01475 (PTAB), Depositions (2);
Macropoint	PTAB Decisions: March 16, 2018, and March 19, 2018, respectively	RUIZ FOOD PRODUCTS, INC. v. MACROPOINT LLC, Case IPR2017-02016, IPR2017-02018; (PTAB); Deposition
Liberty Law (Canada)	Incident date May 10, 2016	Edmonton Alberta Law Courts, RCMP v. Travis Vader (Report), Testimony/Attendance at Trial; Report/Testimony issue

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Geotab	Infringement Contentions 11/13/2015	Perdiem co, LLC vs. Industrack, LLC, et al., Case No. 2:15-cv-727- JRG-RSP (E.D. Tex.), Deposition;
Twilio	Filed Feb 6, 2018	Twilio Inc. v. TeleSign Corp., Case No. IPR2016-00360 (Northern District of California), Deposition
City of Houston Police Department	Indefinite Suspension Issued on February 19, 2016	Houston Police Department v. Officer Ernest W. Walker, Issue #48549-2015 and #48675-2015, Report, Testified at Arbitration;
VIVINT Inc.	Institution Decision March 30, 2016	Alarm.com v. Vivint Inc., Case No. IPR2015-01965 (PTAB), Deposition;
Samsung	2013	ITC, Black Hills Media v. Samsung, In the Matter of CERTAIN DIGITAL MEDIA DEVICES, INCLUDING TELEVISIONS, BLU- RAY DISC PLAYERS, HOME THEATER SYSTEMS, TABLETS AND MOBILE PHONES, COMPONENTS THEREOF AND ASSOCIATED SOFTWARE. Consultant (no report);
Peschke Map Technologies LLC, Plaintiff (On behalf of several defendants)	Petition filed on July 2, 2013	Peschke Map Technologies LLC v. J.J. Gumberg Co, Case No. 12-cv- 1525-SLR (D. Del.), Deposition;